APPENDIX A
DEFINITIONS

BEST TRACK - A subjectively smoothed path, versus a precise and very erratic fix-to-fix path, used to represent tropical cyclone movement, and based on an assessment of all available data.

CENTER - The vertical axis or core of a tropical cyclone. Usually determined by cloud vorticity patterns, wind and/or pressure distribution.

EPHEMERIS - Position of a body (satellite) in space as a function of time; used for gridding satellite imagery. Since ephemeris gridding is based solely on the predicted position of the satellite, it is susceptible to errors from vehicle wobble, orbital eccentricity, the oblateness of the Earth, and variation in vehicle speed.

EXPLOSIVE DEEPENING - A decrease in the minimum sea-level pressure of a tropical cyclone of 2.5 mb/hr for at least 12 hours or 5 mb/hr for at least six hours (Dunnavan, 1981).

EXTRATROPICAL - A term used in warnings and tropical summaries to indicate that a cyclone has lost its "tropical" characteristics. The term implies both poleward displacement from the tropics and the conversion of the cyclone's primary energy source from the release of latent heat of condensation to baroclinic processes. It is important to note that cyclones can become extratropical and still maintain winds of typhoon or storm force.

EYE - The central area of a tropical cyclone when it is more than half surrounded by wall cloud.

FUJIWHARA EFFECT - A binary interaction where tropical cyclones within about 750 nm (1390 km) of each other begin to rotate about a common midpoint (Brand, 1970; Dong and Neumann, 1983).

INTENSITY - The maximum sustained 1-minute mean surface wind speed, typically within one degree of the center of a tropical cyclone.

MAXIMUM SUSTAINED WIND - The highest surface wind speed averaged over a 1-minute period of time. (Peak gusts over water average 20 to 25 percent higher than sustained winds.)

MONSOON DEPRESSION - A tropical cyclonic vortex characterized by: 1) its large size, the outer-most closed isobar may have a diameter on the order of 600 nm (1000 km); 2) a loosely organized cluster of deep convective elements; 3) a low-level wind distribution which features a 100-nm (200-km) diameter light-wind core which may be partially surrounded by a band of gales; and, 4) a lack of a distinct cloud system center. Note: most monsoon depressions which form in the western North Pacific eventually acquire persistent central convection and accelerated core winds marking its transition into a conventional tropical cyclone.

MONSOON GYRE - A mode of the summer monsoon circulation of the western North Pacific characterized by: 1) a very large nearly circular low-level cyclonic vortex that has an outer-most closed isobar with diameter on the order of 1200 nm (2500 km); 2) a cloud band rimming the southern through eastern periphery of the vortex/surface low; 3) a relatively long (two week) life span - initially, a subsident regime exists in its core and western and northwestern quadrants with light winds and scattered low cumulus clouds; later, the area within the outer closed isobar may fill with deep convective cloud and become a monsoon depression or tropical cyclone; and, 4) the large vortex cannot be the result of the expanding wind field of a preexisting monsoon depression or tropical cyclone. Note: a series of small or very small tropical cyclones may emerge from the "head" or leading edge of the peripheral cloud band of a monsoon gyre (Lander, 1993).

RAPID DEEPENING - A decrease in the minimum sea-level pressure of a tropical cyclone of 1.75 mb/hr or 42 mb for 24-hours (Holliday and Thompson, 1979).

RECURVATURE - The turning of a tropical cyclone from an initial path toward the west and poleward to east and poleward, after moving poleward of the mid-tropospheric subtropical ridge axis.

SIGNIFICANT TROPICAL CYCLONE - A tropical cyclone becomes "significant" with the issuance of the first numbered warning by the responsible warning agency.

SIZE - The areal extent of a tropical cyclone, usually measured radially outward from the center to the outer-most closed isobar. Based on an average radius of the outer-most closed isobar, size categories in degrees of latitude follow: 1° to 2° = very small, 3° = small, 4° to 5° = medium (average), 6° to 9° = large, and 10° or greater = very large (Brand, 1972 and a modification of Merrill, 1982).

STRENGTH - The average wind speed of the surrounding low-level wind flow, usually measured within one to three degrees of the center of a tropical cyclone (Weatherford and Gray, 1985).

SUBTROPICAL CYCLONE - A low pressure system that forms over the ocean in the subtropics and has some characteristics of a tropical circulation, but not a central dense overcast. Although of upper cold low or low-level baroclinic origins, the system can transition to a tropical cyclone.

SUPER TYPHOON - A typhoon with maximum sustained 1-minute mean surface winds of 130 kt (67 m/sec) or greater.

TROPICAL CYCLONE - A non-frontal, migratory low-pressure system, usually of synoptic scale, originating over tropical or subtropical waters and having a definite organized circulation.

TROPICAL DEPRESSION - A tropical cyclone with maximum sustained 1-minute mean surface winds of 33 kt (17 m/sec) or less.

TROPICAL DISTURBANCE - A discrete system of apparently organized convection, generally 100 to 300 nm (185 to 555 km) in diameter, originating in the tropics or subtropics, having a non-frontal, migratory character and having maintained its identity for 12- to 24-hours. The system may or may not be associated with a detectable perturbation of the low-level wind or pressure field. It is the basic generic designation which, in successive stages of development, may be classified as a tropical depression, tropical storm, typhoon or super typhoon.

TROPICAL STORM - A tropical cyclone with maximum 1-minute mean sustained surface winds in the range of 34 to 63 kt (17 to 32 m/sec), inclusive.

TROPICAL UPPER-TROPOSPHERIC TROUGH (TUTT) - A dominant climatological system and a daily upper-level synoptic feature of the summer season, over the tropical North Atlantic, North Pacific and South Pacific Oceans (Sadler, 1979).

TYPHOON (HURRICANE) - A tropical cyclone with maximum sustained 1-minute mean surface winds of 64 to 129 kt (33 to 66 m/sec). West of 180° E longitude they are called typhoons and east of 180° E longitude hurricanes.

WALL CLOUD - An organized band of deep cumuliform clouds that immediately surrounds the central area of a tropical cyclone. The wall cloud may entirely enclose or partially surround the center.

WESTERLY WIND BURST - A short-duration low-level westerly wind event along and near the equator in the western Pacific Ocean (and sometimes in the Indian Ocean) (Luther et al. 1983). Typically, a westerly wind burst (WWB) lasts a few days and has westerly winds of at least 10 kt (5 m/sec) (Keen 1988). Most WWBs occur during the monsoon transition months of April-May, and November-December. They show some relationship to the ENSO phenomenon (Luther et al. 1983; Ramage 1986). Some WWBs are even more energetic, with wind speeds of 30 kt (15 m/sec) observed during well-developed systems. These intense WWBs are associated with a large cluster of deep-convective cloud along the equator. An intense WWB is a necessary precursor to the formation of tropical cyclone twins symmetrical with respect to the equator (Keen 1982; Lander 1990).

APPENDIX B

NAMES FOR TROPICAL CYCLONES IN THE WESTERN NORTH PACIFIC OCEAN AND SOUTH CHINA SEA

Column 1		Column 2		Column 3		Column 4	
ANGELA	AN-gel-ah	**ABE**	ABE	**AMY**	A-mee	**AXEL**	AX-ell
BRIAN	BRY-an	**BECKY**	BECK-ee	**BRENDAN**	BREN-dan	**BOBBIE**	BOB-ee
COLLEEN	COL-leen	**CECIL**	CEE-cil	**CAITLIN**	KATE-lin	**CHUCK**	CHUCK
DAN	DAN	**DOT**	DOT	**DOUG**	DUG	**DEANNA**	dee-AN-na
ELSIE	ELL-see	**ED**	ED	**ELLIE**	ELL-ee	**ELI**	EE-lye
FORREST	FOR-rest	**FLO**	FLO	**FRED**	FRED	**FAYE**	FAY
GAY	GAY	**GENE**	GEEN	**GLADYS**	GLAD-iss	**GARY**	GAR-ee
HUNT	HUNT	**HATTIE**	HAT-ee	**HARRY**	HAR-ee	**HELEN**	HELL-en
IRMA	IR-ma	**IRA**	EYE-ra	**IVY**	EYE-vee	**IRVING**	ER-ving
JACK	JACK	**JEANA**	JEAN-ah	**JOEL**	JOLE	**JANIS**	JAN-iss
KORYN	ko-RIN	**KYLE**	KYE-ell	**KINNA**	KIN-na	**KENT**	KENT
LEWIS	LOU-iss	**LOLA**	LOW-lah	**LUKE**	LUKE	**LOIS**	LOW-iss
MARIAN	MAH-rian	**MANNY***	MAN-ee	**MELISSA***	meh-LISS-ah	**MARK**	MARK
NATHAN	NAY-than	**NELL**	NELL	**NAT**	NAT	**NINA**	NEE-nah
OFELIA	oh-FEEL-ya	**OWEN**	OH-en	**ORCHID**	OR-kid	**OSCAR***	OS-car
PERCY	PURR-see	**PAGE**	PAGE	**PAT**	PAT	**POLLY**	PA-lee
ROBYN	ROB-in	**RUSS**	RUSS	**RUTH**	RUTH	**RYAN**	RYE-an
STEVE	STEEV	**SHARON**	SHAR-on	**SETH**	SETH	**SIBYL**	SIB-ill
TASHA	TA-sha	**TIM**	TIM	**TERESA***	teh-REE-sah	**TED**	TED
VERNON	VER-non	**VANESSA**	vah-NES-ah	**VERNE**	VERN	**VAL**	VAL
WINONA	wi-NO-nah	**WALT**	WALT	**WILDA**	WILL-dah	**WARD**	WARD
YANCY	YAN-see	**YUNYA**	YUNE-yah	**YURI**	YOUR-ee	**YVETTE**	ee-VET
ZOLA	ZO-lah	**ZEKE**	ZEEK	**ZELDA**	ZELL-dah	**ZACK**	ZACK

* Name changes: MANNY replaced MIKE in 1991; MELISSA replaced MIREILLE, TERESA replaced THELMA in 1992, and OSCAR replaced OMAR in 1993.

NOTE 1: Names are assigned in rotation and alphabetically. When the last name in Column 4 (ZACK) has been used, the sequence will begin again with the first name in Column 1 (ANGELA).

NOTE 2: Pronunciation guide for names are italicized.

SOURCE: CINCPACINST 3140.1V

APPENDIX C
CONTRACTIONS

A-track	Along-track
AB	Air Base
ABW	Air Base Wing
ABIO	Significant Tropical Weather Advisory for the Indian Ocean
ABPW	Significant Tropical Weather Advisory for the Western Pacific Ocean
ACCS	Air Control Center Squadron
ACFT	Aircraft
ADP	Automated Data Processing
AFB	Air Force Base
AFGWC	Air Force Global Weather Central
AFTN	Airfield Fixed Telecommunications Network
AIREP	Aircraft (Weather) Report
AJTWC	Alternate Joint Typhoon Warning Center
AMOS	Automatic Meteorological Observing Station
AOR	Area of Responsibility
APT	Automatic Picture Transmission
ARC	Automated Remote Collection (system)
ARGOS	(International Service for Drifting Buoys)
ATCF	Automated Tropical Cyclone Forecast (system)
AUTODIN	Automated Digital Network
AWDS	Automated Weather Distribution System
AWN	Automated Weather Network
BLND	Blended (Hybrid Aid)
CCWF	Combined Confidence Weighted Forecast
CDO	Central Dense Overcast
CEC	Circular Exhaust Cloud
CI	Current Intensity
CIV	Civilian
CLD	Cloud
CLIM	Climatology
CLIP or CLIPER	Climatology and Persistence Technique
CM	Centimeter(s)
C-MAN	Coastal-Marine Automated Network
COMNAVMETOCCOM	Commander Naval Meteorology and Oceanography Command
COARE	Coupled Ocean-Atmosphere Response Experiment
CPA	Closest Point of Approach
CPHC	Central Pacific Hurricane Center
CSC	Cloud System Center
CSUM	Colorado State University Model
DAVE	Name of a Hybrid Aid
DDN	Defense Data Network
DEG	Degree(s)
DET	Detachment
DFS	Digital Facsimile System
DMSP	Defense Meteorological Satellite Program
DOD	Department of Defense
DSN	Defense Switched Network
DTG	Date Time Group
EGGR	Bracknell Model
FBAM	FNOC Beta and Advection Model
FI	Forecast Intensity (Dvorak)
FLENUMETOCCEN	Fleet Numerical Meteorology and Oceanography Center
FT	Foot/Feet
GMS	Geostationary Meteorological Satellite
GMT	Greenwich Mean Time

GOES	Geostationary Operational Environmental Satellite
GTS	Global Telecommunications System
hPa	Hectopascal
HPAC	Mean of XTRP and CLIM Techniques (Half Persistence and Climatology)
HF	High Frequency
HR	Hour(s)
HRPT	High Resolution Picture Transmission
ICAO	International Civil Aviation Organization
INIT	Initial
INST	Instruction
IR	Infrared
JTWC	Joint Typhoon Warning Center
JTWC92 or JT92	Statistical-Dynamical Objective Technique
JTYM	Japanese Typhoon Model
KM	Kilometer(s)
KT	Knot(s)
LAN	Local Area Network
LAT	Latitude
LLCC	Low-Level Circulation Center
LONG	Longitude
LUT	Local User Terminal
LVL	Level
M	Meter(s)
MAX	Maximum
MB	Millibar(s)
MBAM	Medium Beta and Advection Model
MCAS	Marine Corps Air Station
MCS	Mesoscale Convective System
MET	Meteorological
MIDDAS	Meteorological Imagery, Data Display, and Analysis System
MIN	Minimum
MINI-MET	Mini-Meteorological
MISTIC	Mission Sensor Tactical Imaging Computer
MM	Millimeter(s)
MOVG	Moving
MSLP	Minimum Sea-level Pressure
NARDAC	Naval Regional Data Automation Center
NAS	Naval Air Station
NASA	National Aeronautics and Space Administration
NCTAMS	Naval Computers and Telecommunications Area Master Station
NEDN	Naval Environmental Data Network
NEDS	Naval Environmental Display Station
NESDIS	National Environmental Satellite, Data, and information Service
NESN	Naval Environmental Satellite Network
NEXRAD	Next Generation (Doppler Weather) Radar
NHC	National Hurricane Center
NM	Nautical Mile(s)
NMC	National Meteorological Center
NOAA	National Oceanic and Atmospheric Administration
NODDES	Naval Environmental Data Network Oceanographic Data Distribution and Expansion System
NODDS	Navy/NOAA Oceanographic Data Distribution System
NOGAPS or NGPS	Navy Operational Global Atmospheric Prediction System
NAVPACMETOCCEN	Naval Pacific Meteorology and Oceanography Center (Hawaii)
NAVPACMETOCCEN WEST	Naval Pacific Meteorology and Oceanography Center (Guam)
NPS	Naval Postgraduate School
NR	Number
NRL	Naval Research Laboratory

NRPS or NORAPS	Navy Operational Regional Atmospheric Prediction System
NSDS	Naval Satellite Display System
NSDS-G	Naval Satellite Display System - Geostationary
NTCC	Naval Telecommunications Center
NWP	Northwest Pacific
NWS	National Weather Service
OBS	Observations
OLS	Operational Linescan System
ONR	Office of Naval Research
OSS	Operations Support Squadron
OTCM	One-Way (Interactive) Tropical Cyclone Model
PACAF	Pacific Air Force
PACMEDS	Pacific Meteorological Data System
PACOM	Pacific Command
PCN	Position Code Number
PDN	Public Data Network
PIREP	Pilot Weather Report(s)
RADOB	Radar Observation
RECON	Reconnaissance
RECR	Recurve (Forecast Aid)
ROCI	Radius of outer-most closed isobar
RRDB	Reference Roster Data Base
RRT	Rapid Response Team
RSDB	Raw Satellite Data Base
RVP	Radial Velocity Product
SAT	Satellite
SEC	Second
SDHS	Satellite Data Handling System
SFC	Surface
SGDB	Satellite Global Data Base
SLP	Sea-Level Pressure
SPAWRSYSCOM	Space and Naval Warfare Systems Command
SSM/I	Special Sensor Microwave/Imager
SST	Sea Surface Temperature
STNRY	Stationary
ST	Subtropical
STR	Subtropical Ridge
STRT	Straight (Forecast Aid)
STY	Super Typhoon
TAPT	Typhoon Acceleration Prediction Technique
TC	Tropical Cyclone
TCFA	Tropical Cyclone Formation Alert
TCM-93	Tropical Cyclone Motion Mini-Field Experiment - 1993
TD	Tropical Depression
TDA	Typhoon Duty Assistant
TDO	Typhoon Duty Officer
TESS	Tactical Environmental Support System
TIROS-N	Television Infrared Observational Satellite-Next Generation
TOGA	Tropical Ocean Global Atmosphere
TOVS	TIROS Operational Vertical Sounder
TS	Tropical Storm
TUTT	Tropical Upper-Tropospheric Trough
TY	Typhoon
TYAN	Typhoon Analog (Forecast Aid)
TYMNET	Time-Sharing Network: Commercial wide area network connecting micro- and main-frame computers
ULCC	Upper-Level Circulation Center
US	United States
USAF	United States Air Force
USCINCPAC	Commander-in-Chief Pacific (AF - Air Force, FLT - Fleet)
USN	United States Navy
VIS	Visual
WESTPAC	Western (North) Pacific
WGTD	Weighted (Hybrid Aid)

WMO	World Meteorological Organization
WRN or WRNG	Warning(s)
WSD	Wind Speed and Direction
X-track	Cross-track
XTRP	Extrapolation
Z	Zulu time (Greenwich Mean Time/Universal Coordinated Time)

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ANNUAL PUBLICATION SUMMARIZING TROPICAL CYCLONE ACTIVITY IN THE WESTERN NORTH PACIFIC, BAY OF BENGAL, ARABIAN SEA, WESTERN SOUTH PACIFIC AND SOUTH INDIAN OCEANS. A BEST TRACK IS PROVIDED FOR EACH SIGNIFICANT TROPICAL CYCLONE. A BRIEF NARRATAIVE IS GIVEN FOR ALL TROPICAL CYCLONES IN THE WESTERN NORTH PACIFIC AND NORTH INDIAN OCEANS. ALL FIX DATA USED TO CONSTRUCT THE BEST TRACKS ARE PROVIDED UPON REQUEST ON DISKETTES. FORECAST VERIFICATION DATA AND STATISTICS FOR THE JOINT TYPHOON WARNING CENTER (JTWC) ARE SUBMITTED.

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